

SSVEO IFA List

Date:02/27/2003

STS - 89, OV - 105, Endeavour (12)

Time:03:57:PM

<u>Tracking No</u>	<u>Time</u>	<u>Classification</u>	<u>Documentation</u>	<u>Subsystem</u>
MER - 1	MET: 000:00:56	Problem	FIAR	IFA STS-89-V-01 D&C
DPS-01	GMT: 023:03:44		SPR	UA Manager: David Buendia
			IPR 88V-0003	562-922-4494
				Engineer: Andy Farkas
				281-282-5318

Title: GPC 3 Mode Switch Standby Detent Failure (ORB)

Summary: At approximately 023:03:44 G.m.t. (000:00:56 MET), when the crew was configuring GPC 3 as a G2 "freeze dry" GPC, they reported that when taking the GPC 3 mode switch from the run to the standby position, there was no detent in the standby position and the switch went into the halt position. Subsequent mode switch changes confirmed that the freeze dry procedure had failed because GPC put-away processing was not completed when the mode switch was inadvertently taken to halt. Jiggling the switch seemed to provide sporadic contact in the standby position.

On flight day 2, a HISAM dump of GPC 3 was performed. GPC 3 was then successfully IPL'ed and put into the G2 redundant set. The GPC 3 mode switch was placed in the run position for the remainder of the mission. A broken detent spring, which results in loss of detent in the standby and halt positions, is the most likely cause of the anomaly. A leverlock bushing holds the switch in the run position. KSC troubleshooting of switch operation is complete. Panel 06 which contains the switch is at NSLD for switch replacement. Failure analysis will be performed on the removed switch.

<u>Tracking No</u>	<u>Time</u>	<u>Classification</u>	<u>Documentation</u>	<u>Subsystem</u>
MER - 3	MET: 000:00:08	Problem	FIAR	IFA STS-89-V-02 MPS
	GMT: 023:02:56		SPR	UA Manager: John Kremer
			IPR 88V-0002	562-922-1445
				Engineer: Tim Reith
				281-282-5328

Title: MPS LH2 4" Disconnect Failed to Pneumatically Close (ORB)
Summary: Data review indicates that following SSME shutdown, the LH2 4" disconnect failed to pneumatically close within the required time. The actual closing time was 11.75 seconds signal to switch compared to the OMRSD File IX requirement of 2.8 seconds maximum (typical times are around 1.7 seconds). The disconnect is commanded closed shortly after MECO. The open indicator was not lost until approximately 11.5 seconds later. This coincides with Orbiter umbilical retract which occurs at 11.4 seconds after the MECO command. It appears that the disconnect closed mechanically in the backup mode as the Orbiter umbilical plate separated from the ET umbilical.

This disconnect was replaced during the STS-89 flow as part of the recycle program to eliminate 4" disconnects with chrome flaking problems. Possible explanations include failure in the pneumatic system to provide closing pressure to the actuator (a solenoid or electrical wiring problem) or mechanical binding/icing within the disconnect pair. This anomaly has no impact on the remainder of the mission. Postlanding video revealed the LH4" actuator to be fully retracted. Also video found the flapper seal cracked which was a result of the mechanical closing of the valve. KSC troubleshooting plan is in place. During troubleshooting, LV50/51 signature traces were taken and the data review looked good. Sector gear alignment by NSLD is completed. The sector gear was out of alignment by 0.007" and the allowable is 0.004". The valve replacement is scheduled for 3/17/98.

<u>Tracking No</u>	<u>Time</u>	<u>Classification</u>	<u>Documentation</u>	<u>Subsystem</u>
MER - 7	MET: 003:00:31	Problem	FIAR	IFA STS-89-V-03
PROP-01	GMT: 026:03:19		SPR	UA
			IPR 88V-0004	PR
				Manager: Samuel Jones
				x39031
				Engineer: Steve Arrieta
				281-282-5436

Title: Vernier Thruster L5D Oxidizer Temperature Erratic (ORB)

Summary: At approximately 026:03:19 G.m.t. (003:00:31 MET), the oxidizer injector temperature (V42T2525C) on vernier RCS thruster L5D began to behave erratically. The indicated temperature rapidly decreased to below the 130 °F leak detection limit resulting in the automatic deselection of L5D by RM. A review of the data confirmed that the erratic temperature indication was an instrumentation problem and not an actual oxidizer leak. The indicated oxidizer injector temperature remained offset low in the 75 to 125 °F range until approximately 026:06:07 G.m.t. (003:03:19 MET) when it recovered. It subsequently failed again at 026:11:30 G.m.t. (003:08:42 MET) and then failed and recovered several times during the remainder of the mission. When the failure initially occurred, attitude control of the Orbiter/Mir stack was passed to the Mir. Due to Mir propellant concerns, attitude control was passed back to the Orbiter at approximately 026:07:48 (003:05:00 MET). Note that TDRS-Z had been brought up to provide complete orbit coverage so that vernier leak detection could be performed by the ground.

To recover partial vernier leak detection using the fuel injector temperatures, a general purpose computer (GPC) memory (GMEM) write procedure was developed and uplinked to change the oxidizer injector temperature leak detection limit of all vernier thrusters from 130 °F to off-scale-low. A BITE 4 read test of MDM FA1 was performed with nominal results. This same anomaly occurred on STS-68 (OV-105/7) and STS-67 (OV-105/8). Extensive troubleshooting was unable to duplicate and isolate the anomaly. The thruster was removed and replaced after STS-68. A non invasive troubleshooting plan has been developed. An inspection of the vehicle/thruster connector is being scheduled. After wiggle testing of the connector, the vehicle connector will have the sockets pertaining to the temperature measurement pulled and replaced. Failure analysis will be performed on the removed sockets. BNA will sponsor a pre-approved GMEM prior to the next flight of OV-105.

<u>Tracking No</u>	<u>Time</u>	<u>Classification</u>		<u>Documentation</u>	<u>Subsystem</u>
MER - 9	MET: 003:23:18	Problem	FIAR	IFA STS-89-V-04	GNC
PROP-02	GMT: 027:02:06		SPR	UA	Manager: Lee Bartlow
			IPR 88V-0006	PR OEL-5-13-1612	562-922-5632
					Engineer: Vester Purkey
					281-282-5381

Title: Vernier Driver F5 RPC 2 Failed Off (ORB)

Summary: At 027:02:06 G.m.t. (003:23:18 MET), reaction jet driver forward-2 (RJDF2) F5 RPC 2 failed off. Shortly after this happened, thruster F5R was commanded to fire, resulting in an F5R fail off due to the lack of driver power, and loss of vernier thruster attitude control of the mated vehicle. After cycling the vernier driver switch and then turning on the forward reaction jet logic and driver power for the forward primary thrusters, RJDF2 F5 RPC 2 power was restored. Vernier thruster F5R was re-selected and vernier control of the mated vehicle attitude was re-established.

The fail off of the RJDF2 F5 RPC 2 is believed to have been caused by a failure in the latch circuit in the forward load control assembly 3. As a result, the RJDF2 logic power switch for forward RCS manifolds 4 and 5 remained on while the Orbiter was docked to the Mir. Following undocking, to troubleshoot this failure, the RJDF2 logic power switch was taken to off to test the latch with the vernier driver power. Vernier logic power remained on indicating that the latch was not hard failed. The logic power switch was left off during the crew awake period and taken back to on during the crew sleep period. On flight day 9, the forward manifold 5 logic and driver power experienced another dropout. The logic switch had been off about 39 minutes before the logic power dropout. The logic switch was taken back to on approximately 1 minute after the dropout, prior to getting a forward vernier firing. KSC troubleshooting is complete. The problem was isolated to the forward LCA no.3 output. Unit replacement is scheduled for 3/12/98.

<u>Tracking No</u>	<u>Time</u>	<u>Classification</u>		<u>Documentation</u>	<u>Subsystem</u>
MER - 10	MET: 004:10:59	Problem	FIAR	IFA STS-89-V-05	RCS
PROP-03	GMT: 027:13:47		SPR	UA	Manager: Samuel Jones

Title: Right RCS Fuel Helium Isolation Valve B Failed To Open (ORB)

Summary: During the planned RCS regulator reconfiguration, the right RCS fuel helium isolation valve B failed to open. The valve position indication (VPI) telemetry indicated that the valve did not move (the close VPI (V42X3127X) stayed on and the open VPI (V42X3126X) stayed off). The crew reported a barberpole talkback. The right RCS helium press B switch was cycled from open to close and back to the open position. The fuel helium isolation valve B still did not open. The switch was then taken to close and the right RCS was returned to the A regulators (the right RCS helium press A switch was taken to open).

A similar problem with this valve (LV301) occurred during the STS-75 processing flow when the valve did not indicate closed after being commanded closed. After 2.5 minutes of applying the closed command, the valve finally indicated closed. Extensive troubleshooting over several subsequent flows could not reproduce the problem. Closed as an UA with the most probable cause being the VPI. During entry, the crew switched the RRCS He ?A? and ?B? isolation valves to Manual Open. The ?B? indicator showed a ?barberpole?, and the ?B? leg was subsequently switched to GPC. The ?B? valve Open indication remained Off following the switch positioning, and the Closed indication remained On. This continued for the duration of entry. During KSC troubleshooting, the valve was found to be hard closed. The Orbiter/Pod connector demate/vehicle troubleshooting found an open circuit at the B-coil on the pod side. The connector saver was removed and the test was repeated at the Orbiter/Pod interface connector. The open circuit was found there also. The Y-web and access door 56-44 was removed to allow resistance testing of the intermediate connector/electrical wiring. The open circuit was found again. The pod will have to be removed. At the HMF, continuity checks will be performed on the Pod wiring prior to committing to a valve replacement.

<u>Tracking No</u>	<u>Time</u>	<u>Classification</u>	<u>Documentation</u>	<u>Subsystem</u>
MER - 11	MET: 005:04:50	Problem	FIAR	IFA STS-89-V-06 GN&C
GNC-01	GMT: 028:07:38		SPR	UA
			IPR	PR GNC-5-13-0088 Manager: Karen Barry 562-922-0483 Engineer: Phil Perkins 281-282-5486

Title: -Z Star Tracker Pressure Fail BITE (ORB)

Summary: At approximately 028:07:38 G.m.t. (005:04:50 MET), the -Z star tracker annunciated a pressure fail BITE. The BITE has remained on since that time. The star tracker is normally pressurized with argon gas to 17.58 psia to prevent moisture and contamination from entering the star tracker during entry and ground operations. The

BITE indicates that the -Z star tracker pressure has leaked below 14.7 psia. There is no impact to flight operations.

This star tracker (S/N 11) had to be repressurized during the STS-89 flow. Removal and replacement of the hardware is scheduled for 3/25/98.

<u>Tracking No</u>	<u>Time</u>	<u>Classification</u>	<u>Documentation</u>	<u>Subsystem</u>
MER - 2	MET: 000:00:50	Problem	FIAR	IFA STS-89-V-07 C&T
INCO-01	GMT: 023:03:38		SPR	UA
			IPR 88V-0012	PR
				Manager: Chien Hsu
				562-922-5538
				Engineer: Jeff Stafford
				281-282-5317

Title: S-Band Antenna Switch Electronics System 2 Failure (ORB)

Summary: At approximately 023:03:38 G.m.t. (000:00:50 MET), the BFS GPC was commanding the lower left forward (LLF) S-band antenna, but the upper left forward (ULF) antenna was being selected. At the time, the S-band antenna switch electronics system 2 was being used. After the SM GPC was configured and the BFS was taken down, the ULF antenna continued to be selected although the SM GPC was commanding the LLF antenna. The ground subsequently commanded the LLF antenna, but still the ULF antenna was selected. At 023:04:02 G.m.t. (000:01:14 MET), antenna switch electronics system 1 was selected and the LLF antenna was selected.

On flight day (FD) 2, antenna switch electronics system 2 was reselected for a short time to perform troubleshooting. The crew used the panel switch to select all eight S-band antennas. No anomalies were noted. Following this troubleshooting, system 1 was reselected. On FD 4, the system was again reselected for a short time to perform additional troubleshooting. The GPC mode of antenna selection was verified utilizing a multiple stored program command to cycle through the switch positions. No anomalies were noted. Following this troubleshooting, system 1 was reselected. For further troubleshooting in the GPC mode, system 2 was reselected for one orbit on FD 7 and several orbits on FD 8 and again, no problems noted. KSC postflight troubleshooting is scheduled.

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MER - 4	MET: 000:02:42	Problem	FIAR	IFA STS-89-V-08 AIRLOCK
	GMT: 023:05:30		SPR	UA
			IPR	PR
				Manager: Tim Cook
				562-922-2068
				Engineer: Chris Hoffman
				281-244-5121

Title: D Hatch Interference with Air Duct (ORB)

Summary: After removing the airlock floor stowage bag, the crew reported they were able to open the D hatch to a position approximately 6 inches above the support pads on the floor of the airlock. The crew reported interference with the forward portion of the D hatch that would not allow the hatch to rest on the support pads. They reported that they removed the stowage bag pallet and disconnected the air duct from the inlet side of the hard duct in the external airlock. The crew stated they were able to complete the opening of the hatch. With the hatch in the proper position, the crew reinstalled the air duct.

The airlock is an ISS configured external airlock which has electrical shrouds below the forward hatch area that cause the air duct 'tee' to be rotated towards the center of the airlock. In the OV-104 configuration the electrical shrouds were not installed and the 'tee' was parallel to the airlock wall. The D hatch was checked in the 9A trainer and the hatch could not be open fully because of air duct interference. Also the hatch could not be close without removing the air duct. The air duct was installed per a crew preference request. The air duct was not in place for CEIT or during MVAK operations, this is why interference was not discovered. BNA reported the next time this interference would show up would be STS-88. The EVA configuration could cause a similar interference. A tech order is being written to document the need to demate the fan package duct at the airlock tee location prior to aft hatch opening or closing,. Crew procedures are being developed to be in place by STS-88.
